

CLAIMS

1. Apparatus for puncturing or otherwise manipulating human or animal tissue or organs, comprising at least one guide device (6) for instance in the form of a rigid or flexible tube, at least one penetrating element (1) which is guided within the guide device (6) and which is displaceable forward and backward and rotatable within this guide device (6) by a control unit (4), further a partial vacuum source (5) generating a partial vacuum, a suction head (7) that is fitted with at least one recess (2) having a lateral aperture,

characterized in that

tissue attachment at the appropriate site of the apparatus of the invention is detected by an attachment detection system (12) and is displayed by a display unit (15).

2. Apparatus as claimed in claim 1, characterized in that the attachment detection system (12) comprises at least one detector measuring a pressure or a change in pressure.

3. Apparatus as claimed in claims 1 through 2, characterized in that a pressure sensor (15) is used to detect a pressure or a change in pressure.

4. Apparatus as claimed in claims 1 through 3, characterized in that the attachment detection system (12) comprises an optical detector to detect tissue/organ attachment.

5. Apparatus as claimed in claims 1 and 4, characterized in that an interruptible light beam (13a) and/or an endoscope (13b) and/or a combined optic-electric detector in the form of electrically conducting fiber optics is used as the optical detector.

6. Apparatus as claimed in claim 1 through 5, characterized in that the attachment detection system (12) comprises an acoustic and/or electrical detector to detect attachment of a tissue or organ.

7. Apparatus as claimed in claim 1 and 6, characterized in that an ultrasonic sensor (14) and/or electrodes are used as acoustic and/or electrical detectors of tissue or organ attachment in the attachment detection system (12), both detectors preferably being designed to identify the tissue/organ and, in the case of electrodes, same in especially preferred manner also being designed to monitor organ functions.

8. Apparatus as claimed in claim 1 through 7, characterized in that the display unit (16) comprises means emitting optical, acoustic, olfactory or tactile (for instance vibrational) signals as the display means.

9. Apparatus as claimed in claim 1 through 8, characterized in that the signals are adjustable in intensity (for instance loud, low acoustic volume) and/or in their frequency (acoustics, color of light) in proportion to the degree of attachment.

10. Apparatus as claimed in claim 1 through 9, characterized in that the recess (2) having the lateral aperture is elongated, whereby sufficient space is assured for the aspirated tissue/organ (10) to allow successful manipulation of said tissue/organ.

11. Apparatus as claimed in claim 1 through 10, characterized in that the vacuum duct within the guide device (6) tapers toward the vacuum aperture (11) in the transition zone to the suction head (7), whereby the more pronounced partial vacuum is generated at the vacuum aperture site.

12. Apparatus as claimed in claim 1 and 11, characterized in that the recess is 8.5 mm long, 4 mm wide and 3 mm deep.

13. Apparatus as claimed in claim 1, characterized in that the penetrating element illustratively is a needle, a drill bit, tongs or an electromagnetic source of radiation.

14. Apparatus as claimed in claim 1 through 13, designed in a manner that the puncture or manipulation is carried out outside the recess (2) or outside the zone of tissue attachment to the suction head (7).

15. Apparatus as claimed in claim 1 through 14, characterized in that it comprises at least one flexible or rigid guide device (6) fitted with several lumens to both guide an element (1) designed to puncture or manipulate tissue or organs and to separately guide detectors, said apparatus being fitted with a suction head (7) which can be repeatedly detached from the guide device (6) and a control unit (4) which can be repeatedly detached from said guide device and which drives the penetrating element (1).